

CLAIM(S):

1. A device for generating a torque, comprising:
a hollow central tube;
a pair of endplates mounted on said central tube, such that said pair of endplates are rotatable about said central tube;
a plurality of elongate members extending between said pair of endplates and radially spaced apart from said central tube, such that said plurality of elongate members are rotatable about said central tube along with said pair of endplates; and

at least one wire loop made from a shape memory effect material wound about said central tube and each of said plurality of elongate members, said wire having been trained in accordance with shape memory effect principles to asymmetrically deform when locally heated, each of said wire loops being oriented so said asymmetric deformation occurs in the same direction.

2. An electric generator comprising:
a rotor comprising:
a hollow central tube;
a pair of endplates mounted on said central tube such that said pair of endplates are rotatable about said central tube;
a plurality of elongate members extending between said pair of endplates and radially spaced apart from said central tube, such that said plurality of elongate members are rotatable about said central tube along with said pair of endplates;

a plurality of oppositely poled magnet pairs, one magnet of each said pair extending between said endplates diametrically opposite the other said magnet of the pair; and

at least one wire loop made from a shape memory effect material wound about said central tube and each of said plurality of elongate members, said wire having been trained in accordance with shape memory effect principles to asymmetrically deform when locally heated, each of said wire loops being oriented so said asymmetric deformation occurs in the same direction; and

a stator including:

a housing at least partially surrounding said rotor, said housing including a coil surrounding said rotor, said coil being generally parallel to said central tube.

3. A system for generating electrical power comprising:

a first sub-system for heating a working fluid using heat from a thermal source;

a second sub-system for feeding said heated working fluid to at least one electrical generator, said at least one electrical generator including:

a rotor including:

a hollow central tube for receiving said heated working fluid;

a pair of endplates mounted on said central tube such that said pair of endplates are rotatable about said central tube;

a plurality of elongate members extending between said pair of endplates and radially spaced apart from said central tube, such that

said plurality of elongate members are rotatable about said central tube along with said pair of endplates;

a plurality of oppositely poled magnet pairs, one magnet of each said pair extending between said endplates diametrically opposite the other said magnet of the pair; and

at least one wire loop made from a shape memory effect material wound about said central tube and each of said plurality of elongate members, said wire having been trained in accordance with shape memory effect principles to asymmetrically deform when locally heated, each of said wire loops being oriented so said asymmetric deformation occurs in the same direction; and

a stator including:

a housing at least partially surrounding said rotor, said housing including a coil surrounding said rotor, said coil being substantially parallel to said central tube; and

a third sub-system for returning the working fluid from said at least one electrical generator to said first system.

4. The system according to claim 3, wherein said second sub-system includes a plurality of said electrical generators.

5. An engine comprising:

a central tube;

a pair of endplates mounted on said central tube;

at least one elongated member extending between said pair of endplates;

at least one wire loop around the central tube and said elongated member, said wire loop including a shape memory effect material.

6. The engine of claim 5, wherein

the central tube is hollow.

7. The engine of claim 5, wherein

the endplates are rotatable about the central tube.

8. The engine of claim 5, wherein

the wire has been trained in accordance with shape memory effect principles to asymmetrically deform when locally heated, each of said wire loops being oriented so said asymmetric deformation occurs in the same direction.

9. The engine of claim 5, further comprising:

a plurality of elongate members extending between the pair of endplates and radially spaced apart from the central tube such that the elongate members and said pair of end plates are rotatable about the central tube.

10. The engine of claim 5, further comprising:

a plurality of said wire loops about the central tube and said elongate member.

11. A method for generating torque comprising:

rotatably mounting a pair of endplates about a central tube;

providing a plurality of satellite tubes extending between the endplates such that the endplates and the satellite tubes are rotatable about the central tube;

looping wire including a shape memory effect material about the central tube and each satellite tube of the plurality of satellite tubes; and

creating asymmetric circumferential deformation in the wire loop by feeding thermal energy through the central tube so as to activate the shape memory effect in each wire loop,

wherein a torque on the respective tubes is generated and causes the pair of endplates and plurality of satellite tubes to rotate about the central tube.

12. A method for generating electricity comprising:

rotatably mounting a pair of endplates about a central tube;

providing a plurality of satellite tubes extending between the endplates such that the endplates and the satellite tubes are rotatable about the central tube;

looping wire including a shape memory effect material about the central tube and each satellite tube of the plurality of satellite tubes;

mounting a plurality of oppositely poled magnet pairs on the endplates, such that one magnet of each said pair is between the endplates and diametrically opposite the other magnet of the pair;

mounting a housing in which a static coil is mounted; and

creating asymmetric circumferential deformation in the wire loop by feeding thermal energy through the central tube so as to activate the shape memory effect in each wire loop,

wherein a torque on the tubes is generated and causes the satellite tubes and magnets to rotate about the central tube and generate electricity.

13. A device for generating torque comprising:
an engine having shape memory alloys.